

INDIANA'S WATER USE

1989

WATER MANAGEMENT PROGRAM

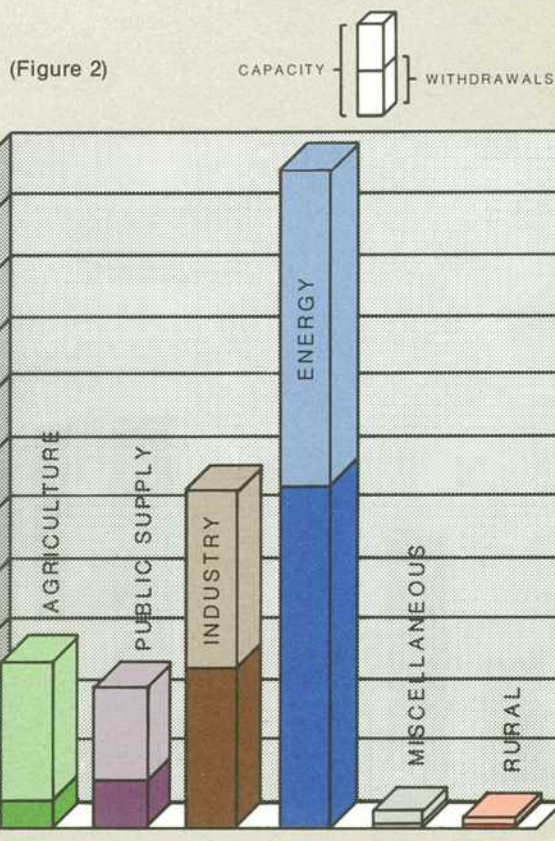
The Indiana Department of Natural Resources, Division of Water has been conducting an inventory of the State's significant water withdrawals since 1984. Indiana Code 13-2-6.1 (Water Resource Management Act) mandates that the owners of all wells and surface water intakes must register with the Division of Water if their pumping facilities have the capability of withdrawing 100,000 gallons or more of water per day. This would be the equivalent to a pump capacity of roughly 70 gallons per minute. The law pertains to both stationary and portable pumps.

Registered significant water withdrawal facilities have been divided into six general water use categories: 1) Energy Production (power generation, coal preparation, heating and cooling); 2) Industrial (process and cooling water, sand and gravel operations); 3) Public Supply (water works, mobile home parks, schools); 4) Agricultural (irrigation, golf course, drainage); 5) Rural Use (livestock watering and fish hatcheries); and 6) Miscellaneous (snowmaking, fish and wildlife areas, lake-level maintenance).

Since the passage of the Water Resource Management Act in 1983, more than 3,200 significant water withdrawal facilities have been registered with the Division. By the end of 1989, there were 2,948 active registrations on file including 4,472 wells and 1,296 surface intakes. The breakdown of active registered facilities for 1989 by water use category is shown in Figure 1.

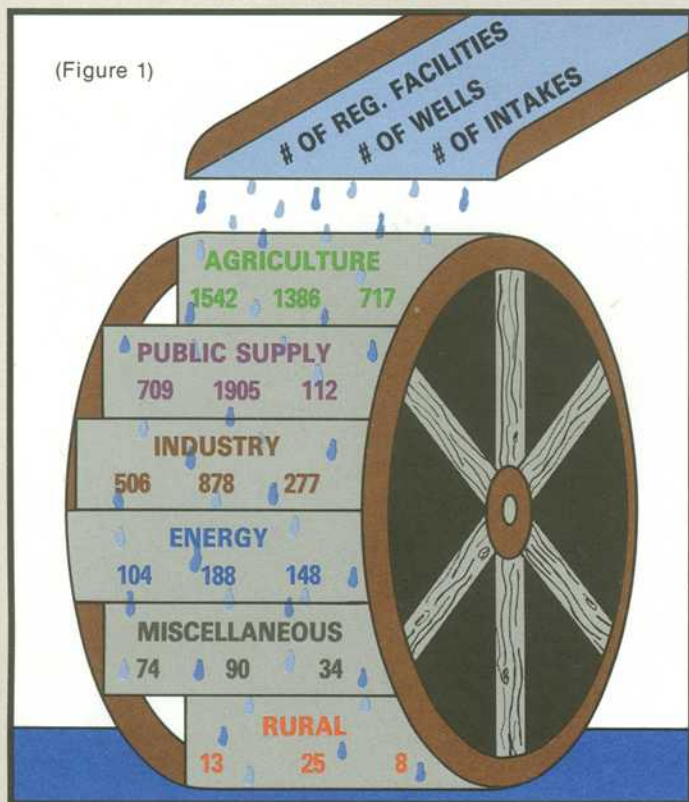
ANNUAL WATER USE REPORTS

The annual reporting of significant water withdrawals is mandated by the Water Resource Management Act. Presently, approximately 25% of the registered facilities utilize flow meters for recording water withdrawals and the remaining 75% estimate their withdrawal amounts. Although metering is not uniformly mandated for all facilities, it is required in those cases where the accuracy of the estimated data is questionable. In recent years, several steps have been taken to ensure that estimating techniques conform to the Division's guidelines. More measures will be taken in the future to improve the accuracy of reported data.



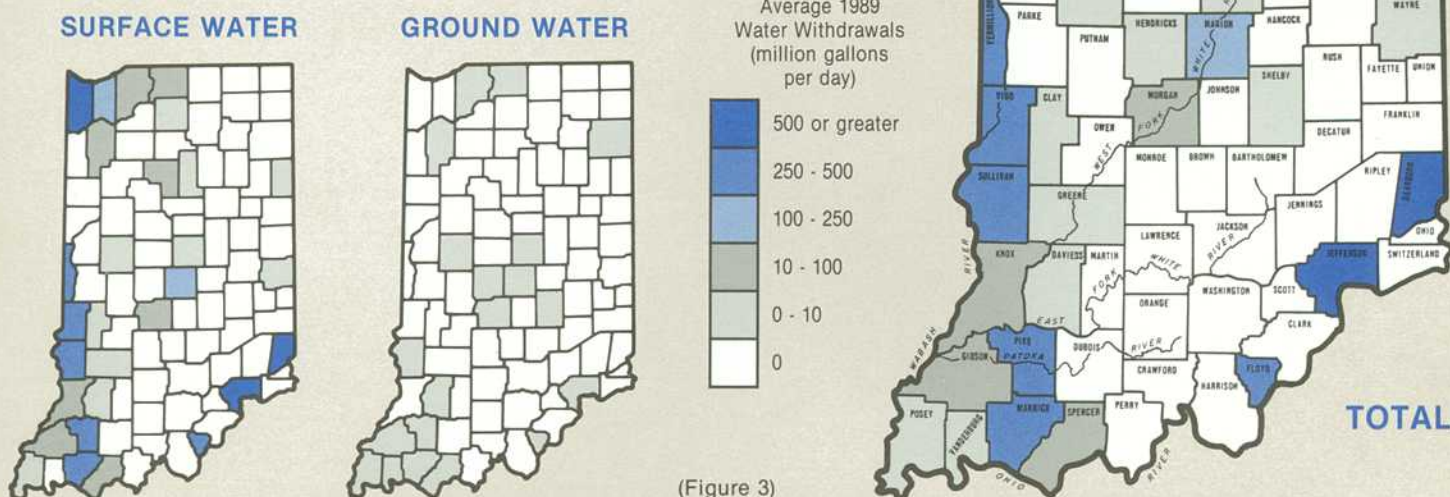
During 1989, owners of 2,948 registered facilities reported total withdrawals of about 3.26 trillion gallons. Of this amount, approximately 77% were withdrawn by 15 energy production and industrial users. The 3.26 trillion gallon total constituted about 42% of the total registered capacity in the state. The combined withdrawal capability of all registered facilities was 21.4 billion gallons per day (BGD). Of this total capability, 18.2 BGD were from surface water sources and 3.2 BGD were from ground water sources. Figure 2 illustrates the reported water withdrawals versus the registered capabilities for each water use category.

(Figure 1)



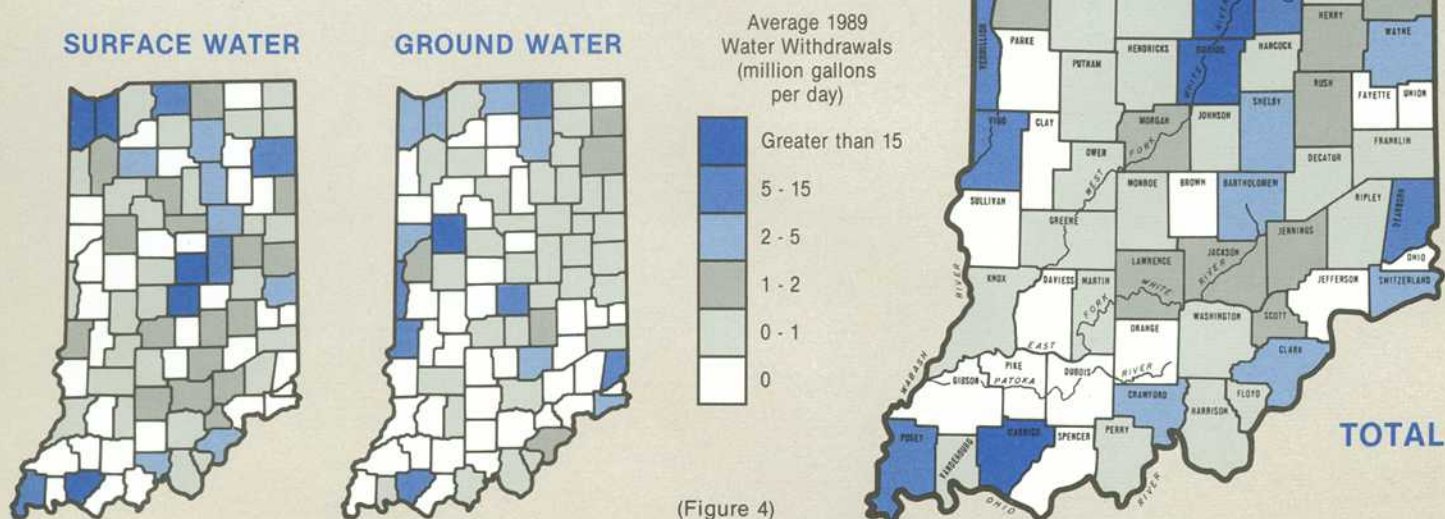
ENERGY PRODUCTION CATEGORY

Water withdrawals in the energy production category averaged 5,683 million gallons per day (MGD) during 1989. Of this amount, 99.5% consisted of surface water. Almost 99% of the water withdrawn in the energy production category was by coal-fired power plants which use water for cooling purposes. The remaining 1% were withdrawals related to coal mining and to heating and air conditioning. It is estimated that about 98% of water withdrawn in this category is returned to its source and is available for re-use within a few days. The major sources of cooling water for electric generating plants are Lake Michigan and the Ohio, Kankakee, Wabash, East Fork White, and West Fork White Rivers. Figure 3 illustrates the energy production water withdrawals for 1989.



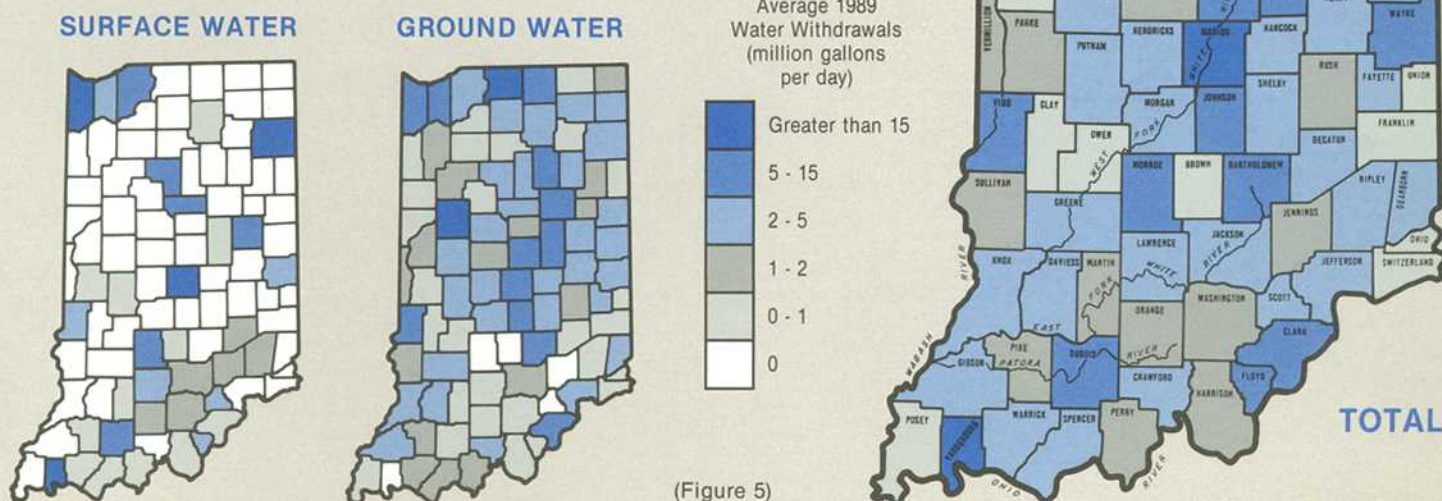
INDUSTRIAL CATEGORY

While many industrial water users purchase water from public utilities, many others have developed their own water supplies. According to a report published by the U.S. Geological Survey, Indiana ranks among the highest industrial self-supplied water users in the nation. In 1989, water withdrawals by self-supplied industries in Indiana averaged 2,505 MGD, 95% of which were from surface water sources. Surface water withdrawals from Lake Michigan in Lake and Porter Counties accounted for approximately 75% of the total water withdrawn by self-supplied industries in Indiana. Information concerning industrial water withdrawals is highlighted in Figure 4.



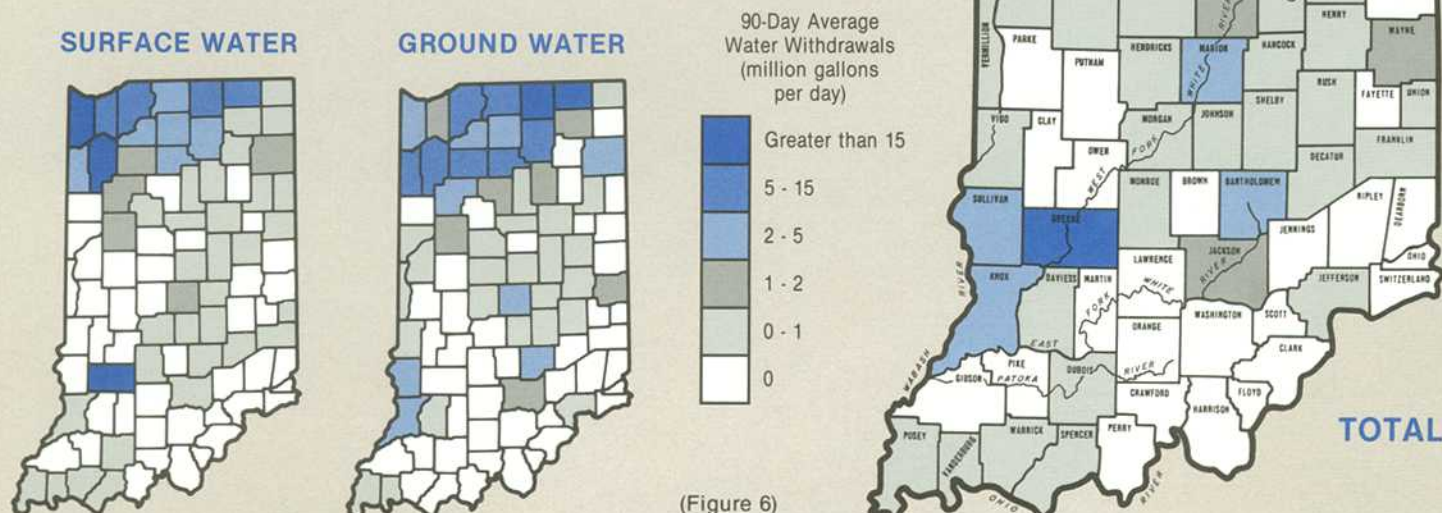
PUBLIC SUPPLY CATEGORY

During 1989, withdrawals in the public supply category averaged 629 MGD. Of this total, 343 MGD were taken from surface water sources and 286 MGD were pumped from ground water supplies. About 97% of the total water withdrawn in this category was taken by public water supply utilities which serve approximately 70% of Indiana's population. The remaining 3% of the total was withdrawn by mobile home parks, schools, hospitals, motels, restaurants, and other facilities which have developed their own supplies for drinking and/or sanitary purposes. In 1989, Marion County reported the largest withdrawals in the public supply category with average withdrawals of 135 MGD. As shown in Figure 5, ground water was the primary source of public water supply for most counties.



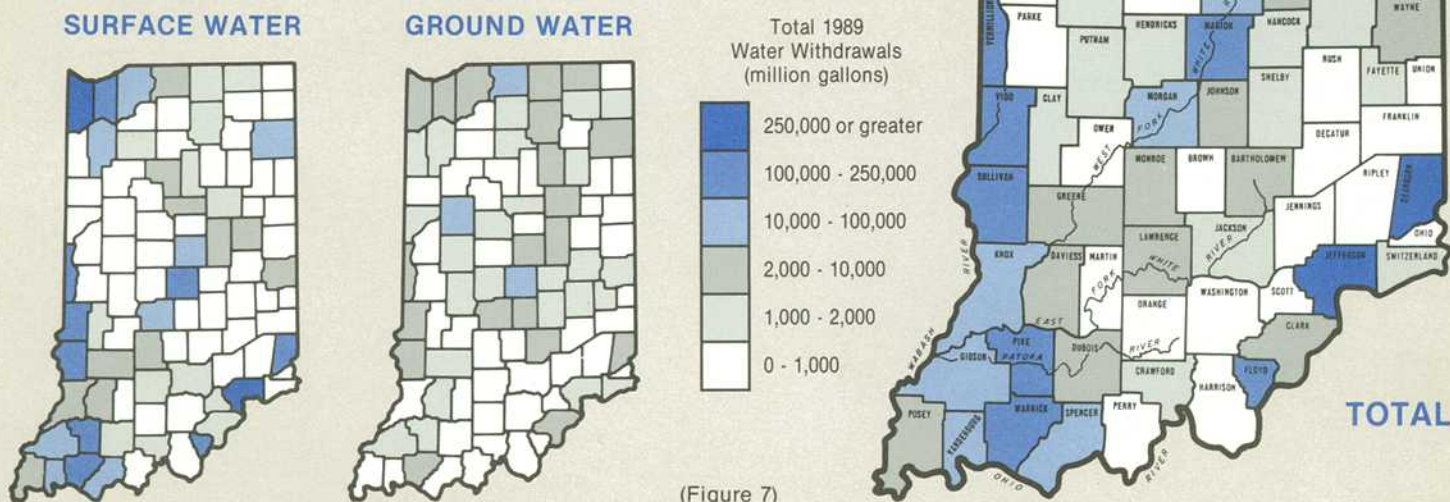
AGRICULTURAL CATEGORY

Reported withdrawals in the agricultural category during 1989 averaged 360 MGD. Of this total, 209 MGD were withdrawn from surface water sources and 151 MGD were taken from ground water. (These average values are based on a 90-day irrigation season.) Agricultural irrigation accounted for 68% of the water withdrawn in this category with Jasper and Lake Counties reporting the highest irrigation totals. Agricultural field drainage constituted 24% of the total agricultural withdrawals. Almost all of the 1989 pumpage in Greene County, which reported the greatest withdrawal in the agricultural category (Figure 6), was for drainage purposes. Golf-course irrigation comprised the remaining 8% of the total water withdrawn in the agricultural category.



OVERALL WATER WITHDRAWALS

In 1989, total reported water withdrawn for all six categories combined was about 3.26 trillion gallons. Of this total, surface water withdrawals accounted for 3.08 trillion gallons (94%) and the remaining 0.18 trillion gallons (6%) were withdrawn from ground water. Figure 7 shows overall water withdrawals in 1989 by county. Comparison of Figure 7 with Figures 3 and 4 reveals that, in general, counties with the greatest water withdrawals were those with large electric generating or industrial plants. Marion County also reported substantial overall withdrawals due to its large metropolitan area. Surface water withdrawals from Lake Michigan and the Ohio River accounted for approximately two-thirds of the total reported water withdrawals in the state.



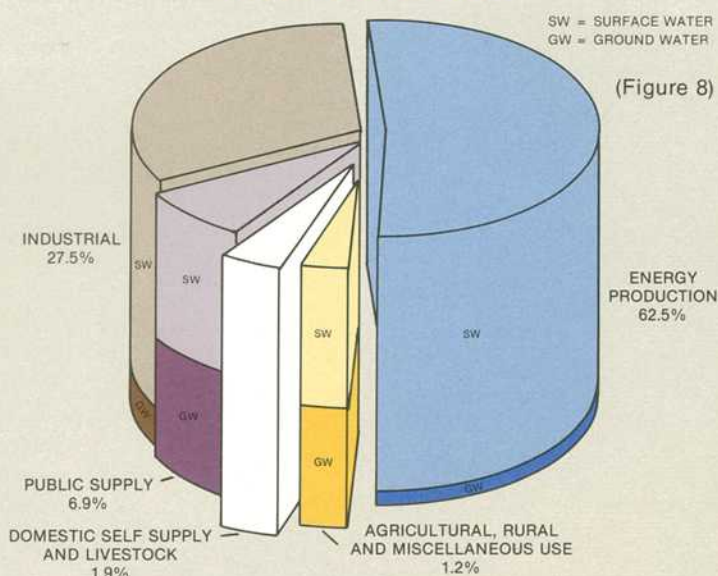
(Figure 7)

REGISTERED WATER WITHDRAWALS BY CATEGORY AND EXEMPT FACILITIES

Reported water withdrawals by registered facilities are shown in Figure 8. The figure also includes the estimated total water withdrawn by facilities with capabilities less than 100,000 gallons per day. Because registration and reporting are not required for these facilities, their aggregated water withdrawals have been estimated.

The two major registration-exempt groups are domestic self-supplied and small livestock operations. Daily per-capita estimates for self-supplied water use range from 50-75 gallons for residents of rural areas and up to 100 gallons for urban residents. The total water withdrawn by domestic self-supplied users was estimated to be 130 MGD in 1989. Water withdrawals by small livestock operations were estimated at 36 MGD based on agricultural statistics and available information on per-head water use. Registration-exempt facilities constituted approximately 2% of the total 1989 water withdrawals (registered and exempt) in the state.

1989 WATER WITHDRAWAL COMPARISONS



(Figure 8)

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